

Work Order ID 59330

Tuesday, June 01, 2010 11:45:55 AM



Page 1

Item ID: D350-748-141TRN

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Turning Detail

Start Date: 6/1/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 6/8/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: PS Date: 10-6-01 Tooling: _____ Date: _____

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D350-748-141	Rev E								
100		0.00							
	MORI SEIKI CNC LATHE LARGE								
Mori Seiki	Memo	0.00							
Mori Seiki CNC Lathe Large	1-Fill tube with sand & install plugs on both ends as per Folio FA648 2-Turn first side as per Folio FA648 3- File transition lines smooth.								
110		0.00							
	QC1- Inspect dimensions to dimension sheet								
QC	Memo	0.00							
Quality Control									
120		0.00							
	MORI SEIKI CNC LATHE LARGE								
Mori Seiki	Memo	0.00							
Mori Seiki CNC Lathe Large	1-Turn second side as per Folio FA648 2- File transition lines smooth. 3-Scribe Part & Batch as per Dwg D350-748-141								

Q.A 10-06-03①

Q.A 10-06-03①

Q.A 10-06-03①

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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Page 2

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Required Date: 6/8/2010 Req'd Qty: 1.00

Reference:

Cust Item ID:

Customer:

Approvals:

Process Plan:

Date:

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run

Start

Stop

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

130

QC1- Inspect dimensions to dimension sheet

0.00



QC

Memo

0.00

Quality Control

B.A. 10-06-03

140

QC8- Inspect parts - second check

0.00



QC

Memo

0.00

Quality Control

(IK) MB 10-06-03

150

Large Fab

0.00



Crosstubes

Memo

0.00

Crosstubes

Grind machining marks

(IK) MB 10-06-03

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Page 3

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Reference:

Accept



Setup Start

Stop

Cust Item ID:

Customer:

Approvals:

Process Plan:

Date:

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run

Start

Stop

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

160



Outsource1

Outsource process - Heat Treat

Memo

Issue P/O: 12209
Heat Treat to min 180 KSI As per Dwg D350-748-141
(MIL-T-6736 OR AMS 2759-1C)
Sand Blast tube after Heat Treat
Possible Supplier: Vac Aero
Ensure Certificate of Conformity is attached

0.00

0.00

CY 10/7/06 ①

170



Packaging

Packaging

Receive & Inspect for Damage & Mat'l Certs

Memo

Ensure certificate of conformaty is attached

0.00

0.00

Rec'd 7/22/06
PO 10/8/3 ①

180



QC

Quality Control

QC6- Inspect dimensions to drawing

Memo

0.00

0.00

506/23

①

LPI

PO 12352

10-730 ①

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Page 4

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Required Date: 6/8/2010 Req'd Qty: 1.00

Reference:

Accept



Setup Start

Stop

Cust Item ID:

Customer:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run

Start

QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

190



Packaging

Packaging

0.00

Memo

0.00

Identify and stock in kanban rack

Location:

Kube cul

(X)

2

MS

12-08-09

200



QC

Quality Control

QC21- Final Inspection - Work Order Release

0.00

Memo

0.00

10/08/09

MF 10-8-9

W/O:		WORK ORDER CHANGES					
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NOTE: Date & initial all entries

Picklist Print

Tuesday, June 01, 2010 11:45:59 AM

Page 1

Work Order ID: 59330

Parent Item: D350-748-141TRN

Parent Item Name: Crosstube Turning Detail


Comments: IPP Rev:A New Issue 08-03-06 DD verified by:ec
 IPP Rev B Removed polish 08.04.02 EC verified by : DD
 IPP Rev C Remove LPS-3 08.06.23 EC verified by DD

Start Date: 6/1/2010

Start Qty: 1.00

Required Date: 6/8/2010

Required Qty: 1.00

Component Item ID/ D6017-115	Replacement	Mfg/ Manufactured	Bin No	Primary	Last	Route 110	Unit of Each	Qty on 26.0000	Qty per Kit 1	Total 1	Qty	Date	Status
													
Crosstube Material													
						<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>					
						LG	26						
						32912	26						

A.M 10-06-03

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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DART AEROSPACE LTD		Work Order:	59330
Description: Crosstube Assembly (AS350/355 High Fwd)		Part Number:	D350-748-141
Inspection Dwg: D350-748-141 Rev: D		Page 1 of 1	

FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article ☐ Prototype

Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.240	+0.005/-0.000	2.242	/		
	2.180	+0.005/-0.000	2.185	/		
	2.180	+0.005/-0.000	2.185	/		
	2.237	+0.005/-0.000	2.242	/		
	2.272	+0.005/-0.000	2.277	/		
	2.306	+0.005/-0.000	2.311	/		
	2.339	+0.005/-0.000	2.339	/		
	2.339	+0.005/-0.000	2.339	/		
	0.062	+/-0.010	0.062	/		
	4.26	+/-0.030	4.260	/		
	R0.063	+/-0.010	R0.063	/		
	R0.50	+/-0.030	R0.500	/		
	2.240	+0.005/-0.000	2.242	/		
	2.180	+0.005/-0.000	2.185	/		
SIDE B	2.180	+0.005/-0.000	2.185	/		
	2.237	+0.005/-0.000	2.242	/		
	2.272	+0.005/-0.000	2.277	/		
	2.306	+0.005/-0.000	2.311	/		
	2.339	+0.005/-0.000	2.339	/		
	2.339	+0.005/-0.000	2.339	/		
	0.062	+/-0.010	0.062	/		
	4.26	+/-0.030	4.260	/		
	R0.063	+/-0.010	R0.063	/		
	R0.50	+/-0.030	R0.500	/		
	110.27	+/-0.060	110.270	/		

Measured by:	A-M	Audited by:	MB	Prototype Approval:	N/A
Date:	10-06-03	Date:	10-06-03	Date:	N/A
Rev	Date	Change	Revised by	Approved	
A	06.11.09	New Issue (P/O D350-748-101)	KJ/JLM		
B	07.10.24	Dwg Rev updated	KJ/EC/DD		

W/O:			WORK ORDER CHANGES					
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Item	Qty -141	Part Number	Description
1	X	D350-748-141	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
2	1	D6017-115	CROSSTUBE
3	2	D3502-1	SUPPORT
4	2	D2856-400-710	ABRASION STRIP
5	1	AELS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
8	1	MS27039-1-10	SCREW

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6017-115
FINISHED LENGTH = 110.270±0.06
- 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D350-748-141" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 30.45 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- 9) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING.
- 12) INSTALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 13) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 14) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 59830
RS10-6-01

RELEASED
R 2009-10-30
WJ

E	REVISE GENERAL NOTES; UPDATE TO CURRENT ADD STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A6-3); TOLERANCES (ZN C6-3, D1-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATE AS MFD.	CP	06.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6017-115 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN	<i>97</i>		
DRAWN	RF		
CHECKED	<i>97</i>		
MFG. APPR.	<i>18</i>		
APPROVED	<i>18</i>		
DE APPR.	<i>18</i>		
DATE	09.09.30		

DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWING NO. D350-748-141	REV. E SHEET 1 OF 4
TITLE CROSSTUBE (AS 350/355 HI FWD)	SCALE NTS

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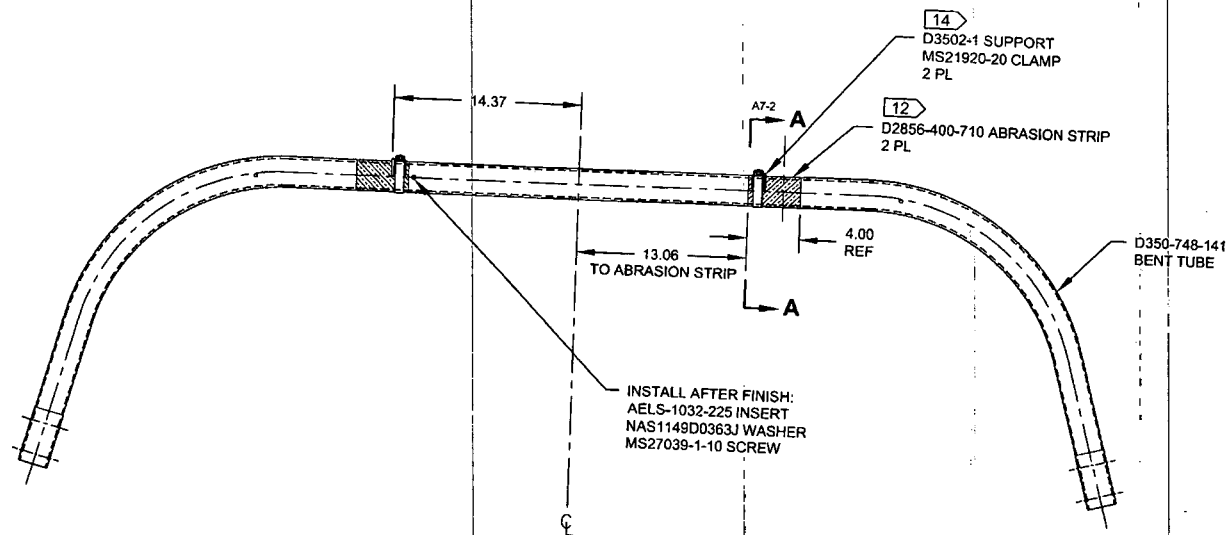
W/O:		WORK ORDER CHANGES					
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

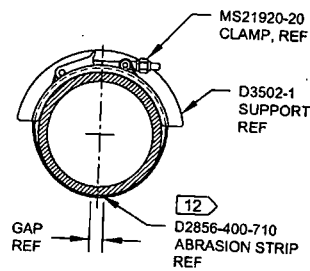
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**D350-748-141
ASSEMBLY DETAIL**



SECTION A-A D4-2
SCALE 4X

w/o 59330

RELEASED
2009-10-29

DESIGN	RF	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF		
CHECKED	RF	DRAWING NO.	REV. E
MFG. APPR.	RF	D350-748-141	SHEET 2 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	09.09.30	<small>COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

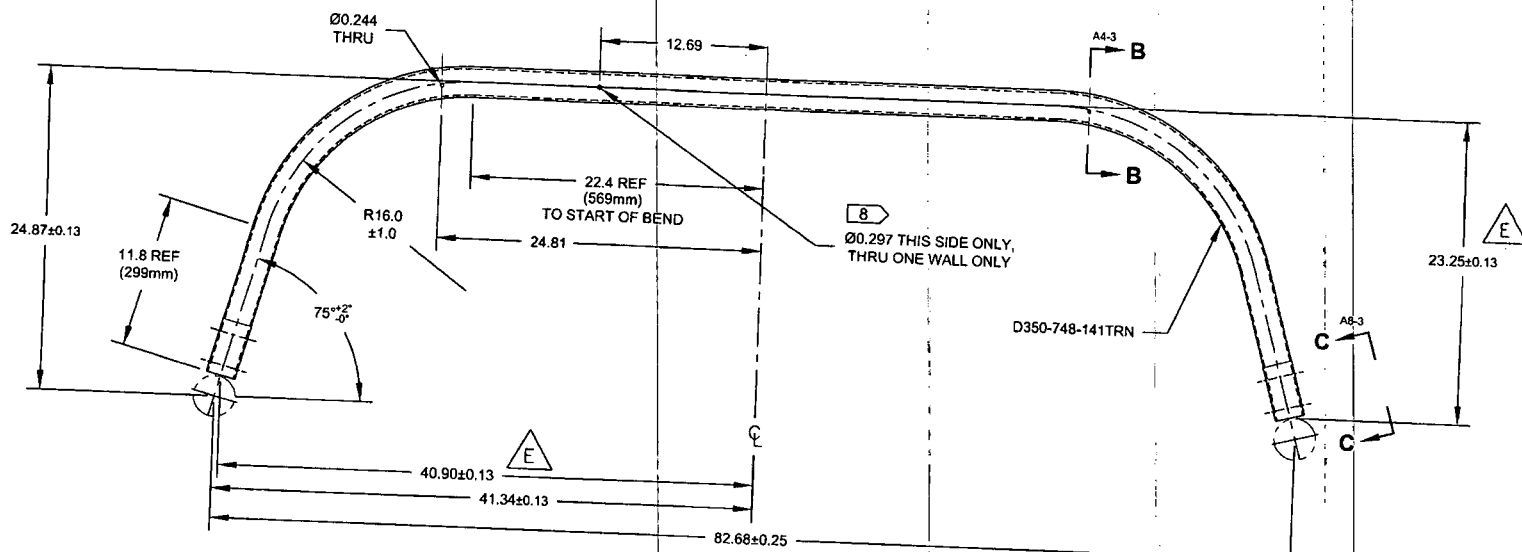
W/O:		WORK ORDER CHANGES					
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

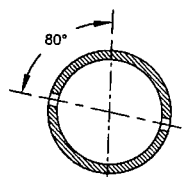
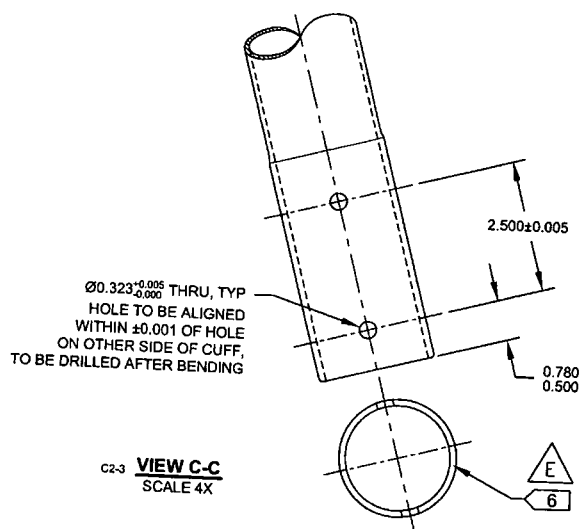
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D350-748-141
BENDING AND DRILLING DETAIL 10



SECTION B-B D3-3
SCALE 4X

w/o 59330

RELEASED
2009-10-29

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DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	Q	DRAWING NO.	REV. E
MFG. APPR.	RF	D350-748-141	SHEET 3 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE (AS 350/355 HI FWD)	NTS
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Dart Aerospace Ltd

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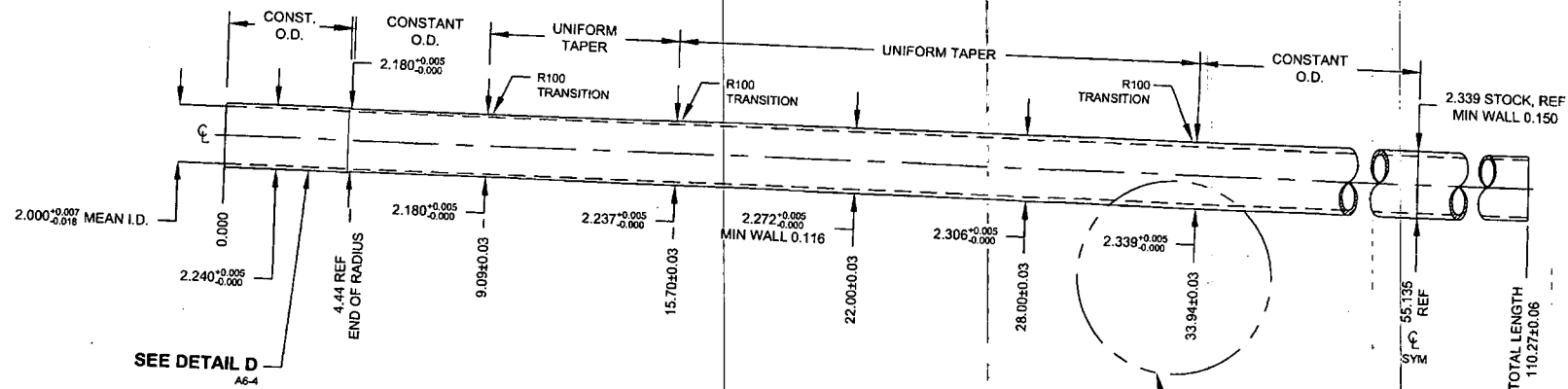
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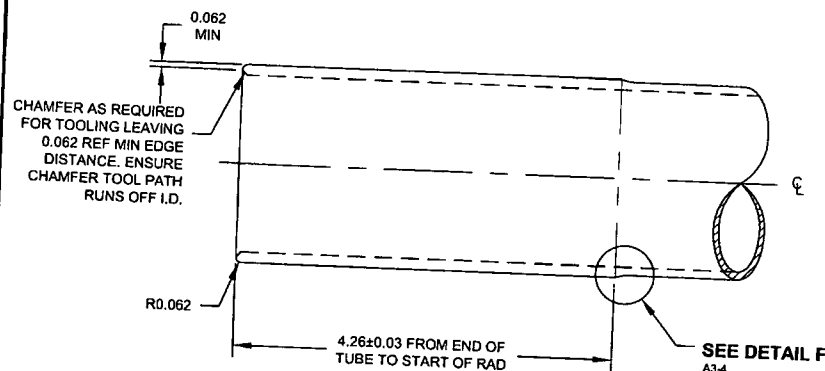
NOTE: Date & initial all entries

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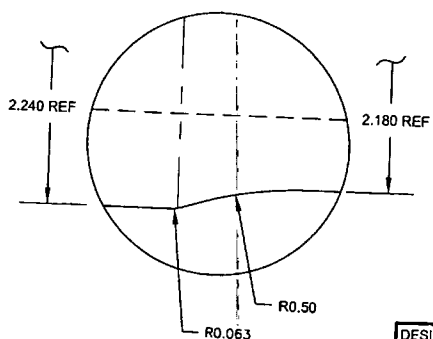


**D350-748-141TRN
TURNING DETAIL**

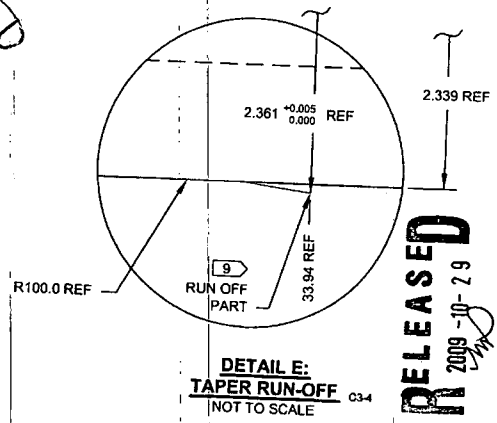
w/o 59330



**DETAIL D:
CROSSTUBE CUFF** C7-4
SCALE 3X



**DETAIL F:
CUFF TRANSITION** A5-4
NOT TO SCALE



**DETAIL E:
TAPER RUN-OFF** C3-4
NOT TO SCALE

DESIGN	RF	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	RF	DRAWING NO.	REV. E
MFG. APPR.	RF	D350-748-141	SHEET 4 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2008 BY DART AEROSPACE LTD	
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2009-10-29

Dart Aerospace Ltd

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VAC AERO
INTERNATIONAL INC.

RELEASE NOTE

GST No.: R105468102

OAK 121151-1

☒ HEAD OFFICE
1371 SPEERS ROAD, OAKVILLE, ONTARIO
CANADA L6L 2X5
TEL: (905) 827-4171 FAX: (905) 827-7489

☐ 2009 WYECROFT ROAD, UNIT B
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CANADA L6L 6J4
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☐ QUEBEC DIVISION
7450 RUE VERITÉ STREET, ST. LAURENT, QUÉBEC
CANADA H4S 1C5
TEL: (514) 334-4240 FAX: (514) 334-6269

07/16/2010

MM / DD / YYYY

PAGE: 1

ILL TO: 1DAR01
DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY, ON

SHIP TO: DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY, ON

K6A 1K7

K6A 1K7

DATE SHIPPED	SHIP VIA	F.O.B.
07/16/2010		ORIGIN
CUSTOMER P/O No.	JOB No.	TERMS
PO12209		NET 30 DAYS

PART No.	DESCRIPTION	UOM	QTY ORD	QTY SHPD	TEST RESULTS
0350-748	CROSS TUBE	EA	16	16	

Process Specifications: Procedure: 4353
HEAT TREATED TO 180 KSI MIN. PER AMS 2759-1E
100% HARDNESS TESTED AS PER ASTM E-18, 40-45 HRC
MATERIAL: 4130
SAND BLASTED AFTER HEAT TREAT

10/02/23

P/N: D350-748-141: 59325, 59326, 59327, 59328, 59329, 59330, 59331, 59332
P/N: D350-748-241: 59586, 59588, 59589, 59549, 59587, 59550, 59551, 59552

100% HARDNESS TESTED

16 pcs 42/43 HRC



hereby certify that the material covered by this release note has been inspected and tested and conforms to all specifications relevant hereto in accordance with the conditions of the contract / or purchase order.

ON BEHALF OF VAC AERO INTERNATIONAL INC.



METAL TREATING INSTITUTE

James Robinson
Authorized Q.C. Inspector



Heat Treating • Welding

VACUUM-BRAZING - HEAT-TREATING - SPECIAL PROCESSING - FURNACE EQUIPMENT
TURBINE COMPONENT OVERHAUL - PLASMA AND OTHER COATINGS



LIQUID PENETRANT TEST REPORT

P- 15186

CLIENT DART Aerospace DATE July 30-2010 PAGE 1 OF 1
ATTENTION LINDA/CHARTEL ACUREN JOB No. 188-10-0814
ADDRESS 1270 ABERDEEN, Hawkesbury PO/WO No. 17209 - LPI 123521
ONTARIO WORK LOCATION 188-10-0814
K&H 1K7 ACCEPTANCE STD. ASTM 1417 REV./DATE 2007
PROJECT F.P.I. on cross TUBES
ITEM(S) EXAMINED 4 PCS

JOB DESCRIPTION

PROCEDURE No. LT-0007 REV./DATE

TECHNIQUE No. LT-0002 REV./DATE

PART No.

MATERIAL STEEL

THICKNESS

SCOPE

WET FLUORESCENT LIQUID PENETRANT

INSPECTION CARRIED OUT 100% EXTERNAL

TEST DETAILS

METHOD ☒ FLUORESCENT ☐ VISIBLE
FAMILY BRAND MAGNAFLUX
PENETRANT 2LG7 MINIMUM DWELL TIME 45 MIN.
PENETRANT REMOVER H2O MINIMUM DRY TIME >10 MIN.
DEVELOPER SK9 52 MINIMUM DWELL TIME 10 MIN.
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY
☒ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED
BLACK LIGHT S/N 16459 ☐ OUTPUT > 1000 μ W/cm² ☐ AMBIENT < 2 fc
LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE
OTHER LABINO
LIGHT METER S/N 1098866 CAL DUE DATE OCT-19
2010

TEST SURFACE

SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☐ MACHINED ☐ SHOT BLASTED ☒ CLEAN BARE METAL
SURFACE TEMPERATURE ☐ < -4°C/ 20°F ☐ -4°C/ 20°F TO 10°C/50°F ☐ 10°C/50°F TO 52°C/125°F ☐ > 52°C/125°F

RESULTS-

☐ METRIC ☐ IMPERIAL

- 1 CROSS TUBE W.O. 59586
ITEM I.D. D350-748-241TRN ✓
- 1 CROSS TUBE W.O. 59552
ITEM I.D. D350-748-241TRN ✓
- 1 CROSS TUBE W.O. 59330
ITEM I.D. D350-748-141TRN ✓
- 1 CROSS TUBE W.O. 59325
ITEM I.D. D350-748-141TRN ✓

PROCESS TO NDT INSPECTION.
- TURN ON LATHE
- Q.C. INSPECTION DIMENSIONS
- GRIND-MACHING MARKS
- Q.C. INSPECTION VISUAL.
- OUTSOURCE : HEAT TREAT
: SAND BLAST.
- Q.C. RECEIVING INSPECTION.
- D.L.P.I. (FLUORESCENT LEVEL II
INSPECTOR.) COMPLETED JULY 30-2010

10-08-03

Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE

TECHNICIAN (SIGNATURE):

NAME (PRINT):

PRINT

SIGNATURE

1ST TECHNICIAN

2ND TECHNICIAN

CGSB LEVEL II SNT LEVEL

CGSB LEVEL SNT LEVEL

CGSB REG. No 6606

CGSB REG. No

DTR #

E63374

REPORT

REVIEWED BY:

NAME

INITIALS

WHITE - CLIENT COPY

CANARY - OFFICE COPY

PINK - TECHNICIAN COPY

BOLS - OFFICE COPY